

SEA GRANT PROGRAMS STRIKE A BALANCE BETWEEN PROTECTING SPECIES AND PROTECTING ECONOMIES

By Dan Williams

Population growth, coastal development and greater demand for seafood generate increasing interaction between people and protected marine species. Is it possible to protect imperiled species without inhibiting economic activity? The Sea Grant Program has some answers.

In commercial fishing, many fish end up as bycatch, caught unintentionally by vessels targeting other fish. Marine mammals and birds can become bycatch, too. Bycatch is accidental and indiscriminate. Species caught and killed in this manner can include those that are endangered, protected or threatened. If bycatch of a certain species within a particular fishery gets too high, the fishery could be curtailed or even shut down, causing economic hardship for commercial fleets and coastal communities—and higher prices for consumers.

Through research, education and outreach, Sea Grant is addressing bycatch from the Gulf of Maine to the Gulf of Mexico to the Gulf of Alaska. And from California to the Caribbean, Sea Grant programs are helping recreational fishermen and beachgoers learn how to conserve, manage and interact with marine species that are of special importance to their areas.

The highest rates of bycatch are associated with shrimp trawling. Shrimp trawl fisheries account for 2 percent of the world's total catch of all fish, by weight, but more than 33 percent of the world's bycatch.

In New Hampshire, Sea Grant is working on a project to modify shrimp trawl design to reduce the catch of fish and smaller shrimp. In sea trials in the Gulf of Maine, the new gear not only resulted in larger caught shrimp but also reduced bycatch of herring, a fish that's important to both the economy and the marine food web, by 90 percent.

In the Gulf of Mexico, Texas Sea Grant is working directly with shrimpers on trawl gear demonstration projects. New gear that proved effective at reducing bycatch was also reducing shrimp take by 10 percent—a significant economic hit for a fishery recovering from hurricane damage and competing with imported farmed shrimp. More recent gear developments are

now allowing a better shrimp catch but are more complex and challenging to use. Texas Sea Grant has conducted workshops and training in 27 ports and distributed 600 new trawl devices to shrimp vessels, helping reduce bycatch and boost a beleaguered industry.

Meanwhile, back on the East Coast, the Rhode Island and New Hampshire Sea Grant programs have contributed to a major success story in the cod and haddock fisheries. Research sponsored by the two programs led to the development of the Eliminator Trawl—new gear that is extremely effective at reducing bycatch of cod, an endangered fishery, while allowing the capture of haddock, a recovered fishery.

Use of the nets has become widespread, boosting Northeast fishery economics by opening previously closed haddock areas and allowing further recovery of the cod fishery. In tests, the nets reduced cod catch by 61 percent, with only a 16 percent loss of haddock, and eliminated almost all other species from capture, including flounder, lobster, skates and dogfish.

In Alaska's longline fisheries, it was seabird, not fish, bycatch that was creating problems. Many birds commonly drawn to fishing operations would become hooked and drown as they attacked sinking baited hooks. Sometimes, the victims were short-tailed albatrosses, an endangered species. Regulations stipulated that a take of six short-tailed albatrosses within a two-year period could interrupt or close Alaska's \$300 million longline fisheries.

Building on earlier collaborative work to reduce seabird bycatch in salmon drift nets, Washington Sea Grant launched a suite of research and outreach programs in collaboration with industry, NOAA Fisheries and the U.S. Fish and Wildlife Service to

reduce seabird bycatch in Alaska's longline fisheries. A two-year research program led to development of parallel streamer lines played out behind the vessel to a point beyond where the baited hooks sink. This solution proved almost 100 percent successful at eliminating the catch of albatrosses and resulted in an overall eight-fold decrease in seabird mortality.

Washington Sea Grant is now applying its model for research and



industry collaboration to the West Coast groundfish fishery and, internationally, to several fisheries in the Southern Hemisphere.

In Virginia's striped bass gillnet fishery, the issue was not bycatch but mortality of smaller striped bass that were caught and then discarded because they were considered too small for market. Virginia Sea Grant provided data that the state used to develop new regulations governing net mesh sizes. Previously, the fisher could choose the mesh size. The result is a better-managed fishery and reduced mortality among smaller striped bass.

Interaction between people and marine life is not limited to commercial fishing operations. In the Caribbean, coastal development and a growing tourism industry are threatening sea turtles habitat. Puerto Rico Sea Grant organized a cadre of beach volunteers that monitored three marine turtle species, generated important data about threats to the species and raised funds for educational signage about sea turtle habitat, regulations and conservation. The data



helped develop conservation strategies and a regional Protocol for Sea Turtle Management.

Sport fishing is an important economic contributor to coastal areas. But when species are threatened and seasons shortened, fishing and tourism businesses suffer. Four Sea Grant programs are helping to improve the survival of released sport fish and keep sport fisheries sustainable. The California, Oregon and Southern California Sea Grant programs are all engaged in educating sport fishermen about barotrauma in rockfish. Barotrauma occurs from the change in pressure when fish are reeled in, causing their swim bladders to swell, and mortality is high among fish that are not properly handled.

California Sea Grant research led the California Department of Fish and Game to discourage use of venting—puncturing the swim bladder with a hollow needle. California and Oregon Sea Grant collaborated on an educational program to explain different methods for returning rockfish to depth. In Oregon, the Department of Fish and Wildlife estimates that 78 percent of catch-and-release fishermen use the methods taught by the program, resulting in a 50 percent reduction in rockfish mortality.

Reduced fish mortality is also the result of North Carolina Sea Grant's efforts to educate sport fishermen about the use of circle hooks. North Carolina Sea Grant staff members have been attending fishing tournaments and conducting workshops about the hooks, which increase survivability in catch-and-release fisheries by an estimated 25 percent.

Sea Grant programs are making a difference in minimizing the accidental mortality of protected or sensitive marine species from bycatch and other human activities. It all adds up to stability and sustainability, both ecologically and economically. ❖

Sea Grant Reduces Bycatch Mortality and Fosters Positive Interactions between Humans and Protected Species

Population growth, coastal development and greater demand for seafood generate increasing interaction between people and protected marine species.

In commercial fishing, fish, marine mammals and birds can become "bycatch," caught unintentionally by vessels targeting different species. Bycatch can further deplete an already endangered fishery. Bycatch of too many threatened or endangered species can curtail or even shut down a fishery. In sport fisheries, some catch-and-release practices actually kill the fish that are released. In coastal tourism areas, development and human activity can devastate sensitive habitat. All of these actions have economic consequences. Sea Grant is addressing these issues by finding solutions to regional problems and effectively applying them to other regions through its national network.

Sea Grant programs in Rhode Island and New Hampshire have supported research on new shrimp trawls and haddock nets. New shrimp trawl gear has not only resulted in larger caught shrimp but also reduced bycatch of herring—a fish that's important to both the economy and the marine food web—by 90 percent. Texas Sea Grant has taken new gear technology to the shrimp industry in the Gulf of Mexico, conducting workshops and training in 27 ports and distributing 600 new bycatch-reducing trawl devices to the shrimp industry. In the Alaska longline fishing fleet, solutions developed by Washington Sea Grant reduced bycatch of endangered short-tailed albatrosses by nearly 100 percent, preventing closure of a fishery worth \$300 million annually. Sea Grant is now applying these solutions in the West Coast groundfish fishery and even internationally. New haddock nets developed in Rhode Island and New Hampshire have caught on in the North Atlantic, reducing cod catch by 61 percent, with only a 16 percent loss of haddock, and eliminating almost all other species from capture, including flounder, lobster, skates and dogfish.

In Pacific recreational fisheries, California and Oregon Sea Grant programs are improving the survivability of rockfish that are caught and released. California Sea Grant research led the California Department of Fish and Game to discourage popular practices that were proving fatal to rockfish. California and Oregon collaborated on an education program, and the Oregon Department of Fish and Wildlife estimates that 78 percent of catch-and-release fishers use the methods taught by the program, resulting in a 50 percent reduction in rockfish mortality in that state. North Carolina Sea Grant used the same type of approach to educate recreational fishers about circle hooks, which have increased catch-and-release survivability by an estimated 25 percent